SCIENTISTS HAPPY TO UPSET A THEORY

Concept of Antibodies Had Served Purpose, They Say

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Special to The New York Times.

HOUSTON, March 3 — The short, happy life of an important scientific theory ended at a conference that concluded here today.

The demise was not mourned by the man who conceived the theory nor by its antagonists. Itw as a small enough price to pay, they believed, for the good the concept had done in the three years of its existence.

The theory had to do with the way the body defends itself against intrusion by infectious agents and other foreign materials. It also bore on matters relating immportantly to cancer, to the possibility of transplanting tissues and organs from one person to another and to such basic biological questions as how living cells become specialized.

Although the man who developed the concept—known as the "clonal selection theory" of immunity—rejected it formally here for the first time, the fruits of his thinking persist in lines of thought that it stimulated.

The rejected theory also, according to scientists here, resulted in a number of interesting experiments on various facets of immunology in laboratories around the world.

The question this theory tried to answer—and still may have done so in part—was: how do cells produce defensive substances, known as antibodies, against foreign matter?

Two Theories Sketched

One popular view has been that certain foreign materials, called antigens, acted as molds or templates, according to which the antibodies that inactivate them would be formed. This is what is known as an "instructive" theory, the structure of the antigens being the instructions for synthesis of the corresponding antibodies.

Another way this defense mechanism might work would be through the existence of cells already endowed with the "knowledge" of how to make certain antibodies. The appearance of a particular antigen would selectively stimulate the production of the appropriate counter-agent. This is a "selective" theory of immunity.

It was the refinement of that sort of concept that was discarded at this sixteenth annual symposium on fundamental cancer research, sponsored by the M. D. Anderson Hospital and Tumor Institute of the University of Texas.

The theory was proposed in 1959 by Sir Macfarlane Burnet, a Nobel Prize winner from the Walter and Eliza Hall Institute of Medical Research of the University of Melbourne, Australia. Now rejected, the theory held that the totality of immunologically reactive cells in an organism was "born" with the information for making antibodies against every conceivable type of antigen but lost the instructions for so destroying components of itself very early in life.

Accordingly, whenever a foreign substance—say a bacteria — was encountered, cells that already "knew" how to make specific antibodies against the bacterial antigen would be stimulated selectively to proliferate and turn out appropriate amounts of protective units. A line of such defender cells is called a clone, hence the name clonal selection theory.

Concept Was Appealing

This theory appealed to many immunologists who, for one thing, could not conceive how an instructive theory might explain immunological tolerance, that is, how cells could be instructed not to do certain things such as react against their own components.

On the other hand, the clonal selective theory was vigorously attacked by scientists who could not see how the information for making 10,000 to 1,000,000 different types of antibody could be kept in the body by as many distinct cell lines throughout the life of an organism.

It was this very controversy that helped in part the explosive growth of the field of immunology in the last few years. The question seems now to have been resolved, at least at its simplest level.

Although still preliminary, results of experiments reported by Dr. John Trentin of Baylor University and the M. D. Anderson Institute appear to kill the clonal selection theory as Professor Burnet had originally formulated it.

By an intricate experimental scheme, Dr. Trentin was able to obtain singles clones of immunologically reactive cells and to get them to grow in animals whose defense mechanisms had been destroyed with radiation. The animals were then exposed to four different antigens.

According to the clonal selection theory, the chances that any one of these antigens would be just the right one to stimulate antibody production in any single transplanted clone of cells was about 1 in 10,000 to 1 in 1,000,000.

After Dr. Trentin reported that he had obtained antibody production in the transplanted clones with all four of the test antigens, Professor Burnet remarked.

"Well, that wipes [the clonal selection] theory out, though I hope I rejected it earlier, myself."

He was alluding to the presentation of his paper in which he cited other experimental evidence against his theory.

He did not abandon the concept altogether, however, insisting that some form of selection must be involved in immune reactions along with genetic or hereditary mechanisms, and possibly some type of instruction.